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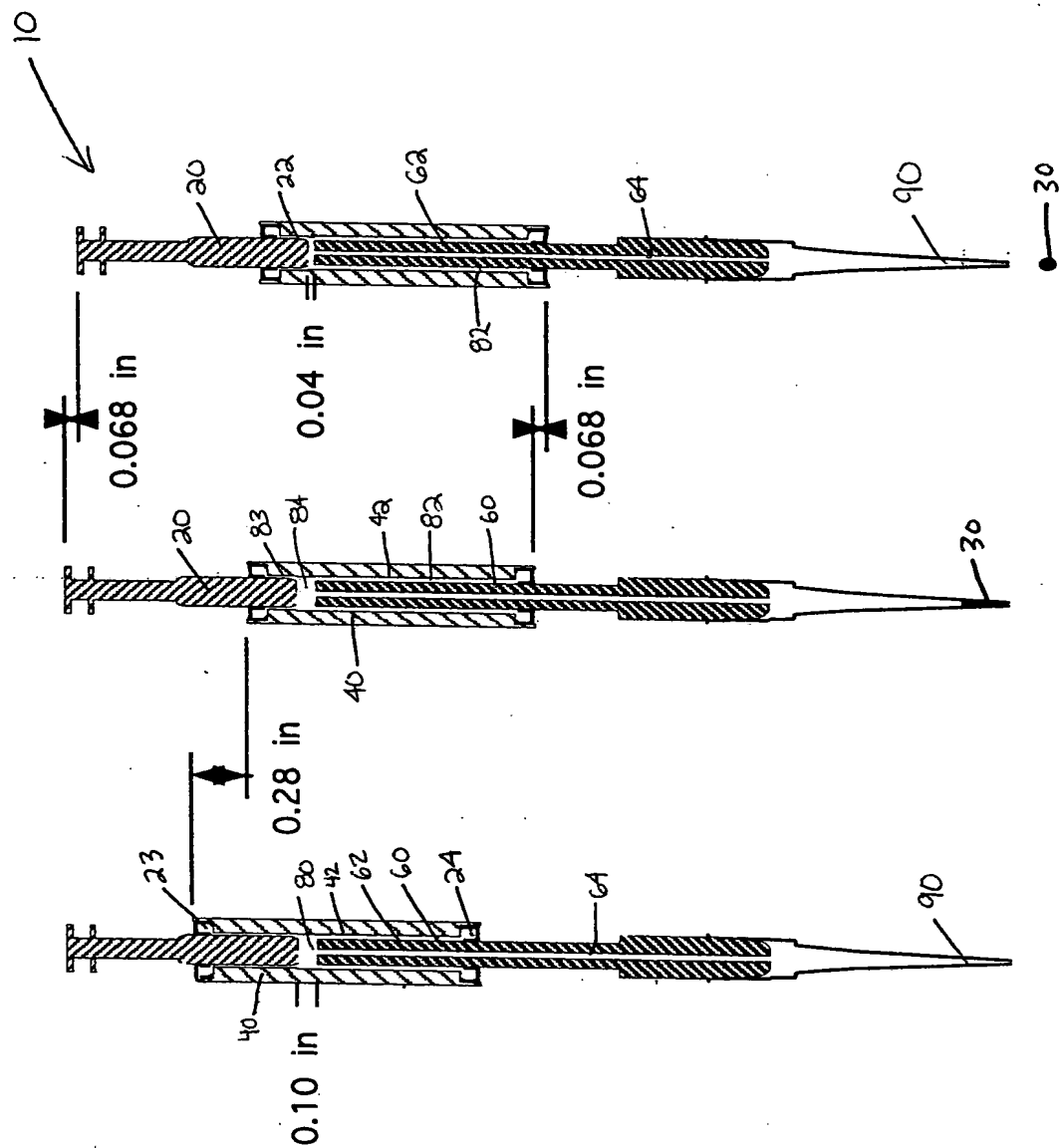
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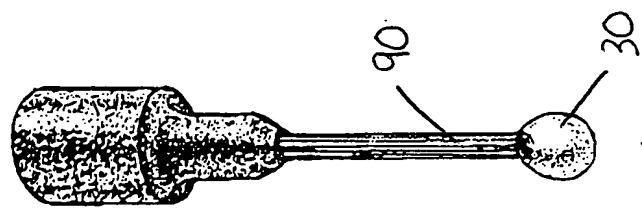


Fig. 2A

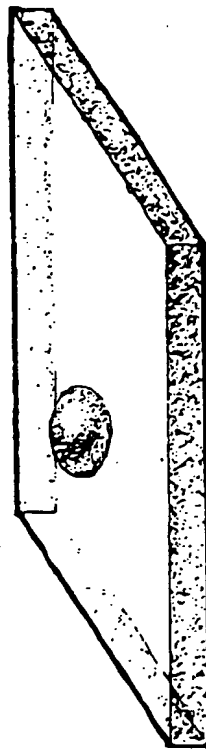
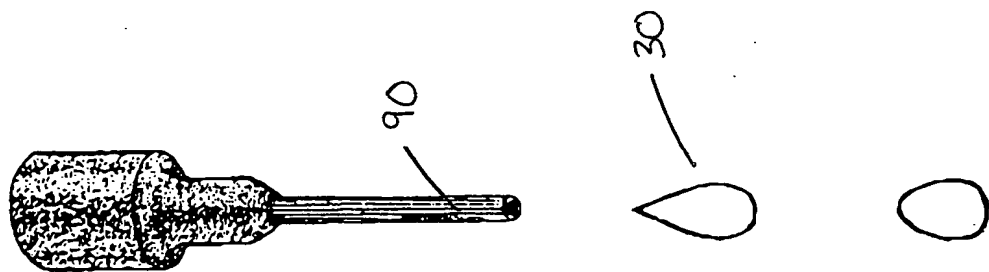


Fig. 2B

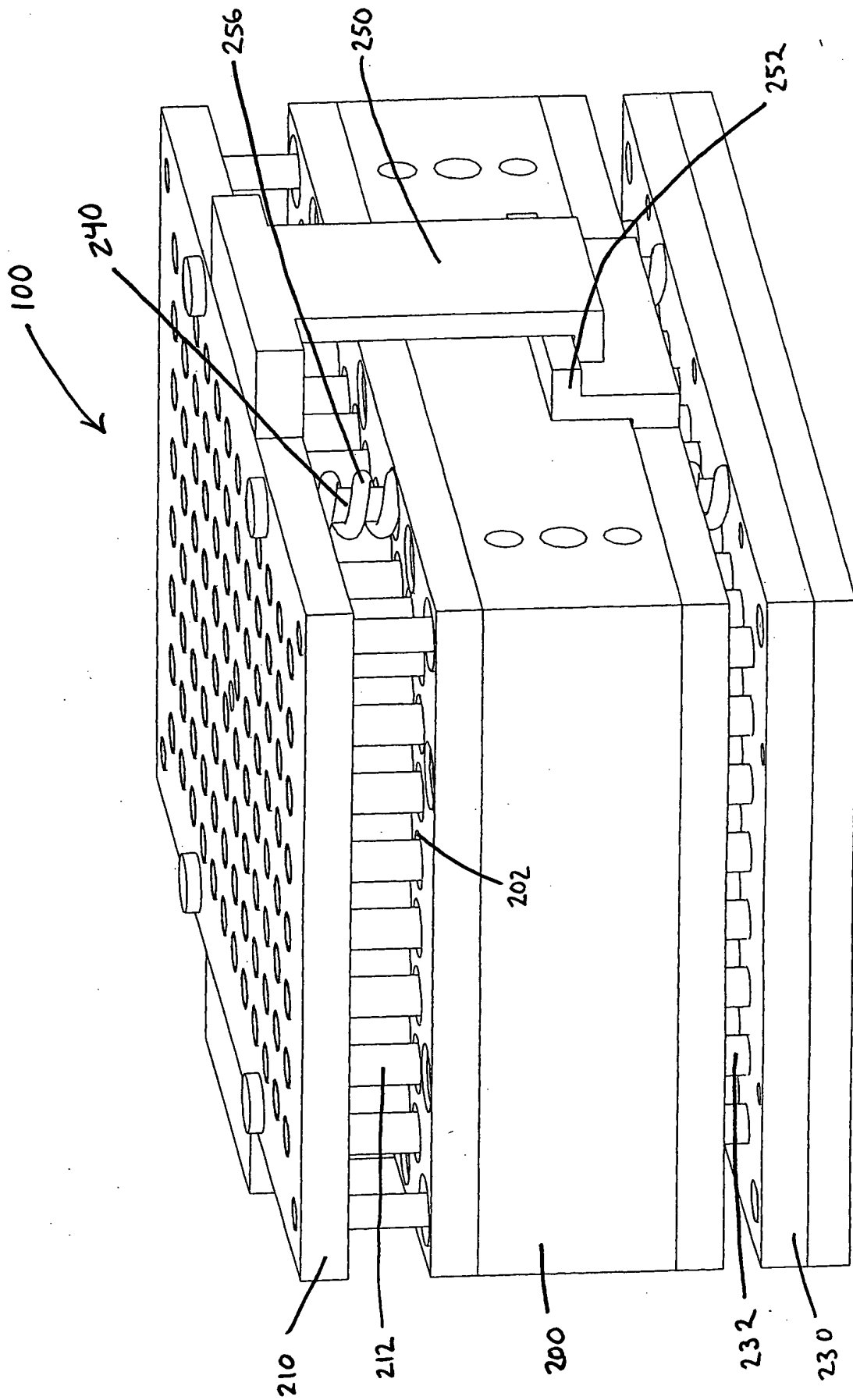


Fig. 3

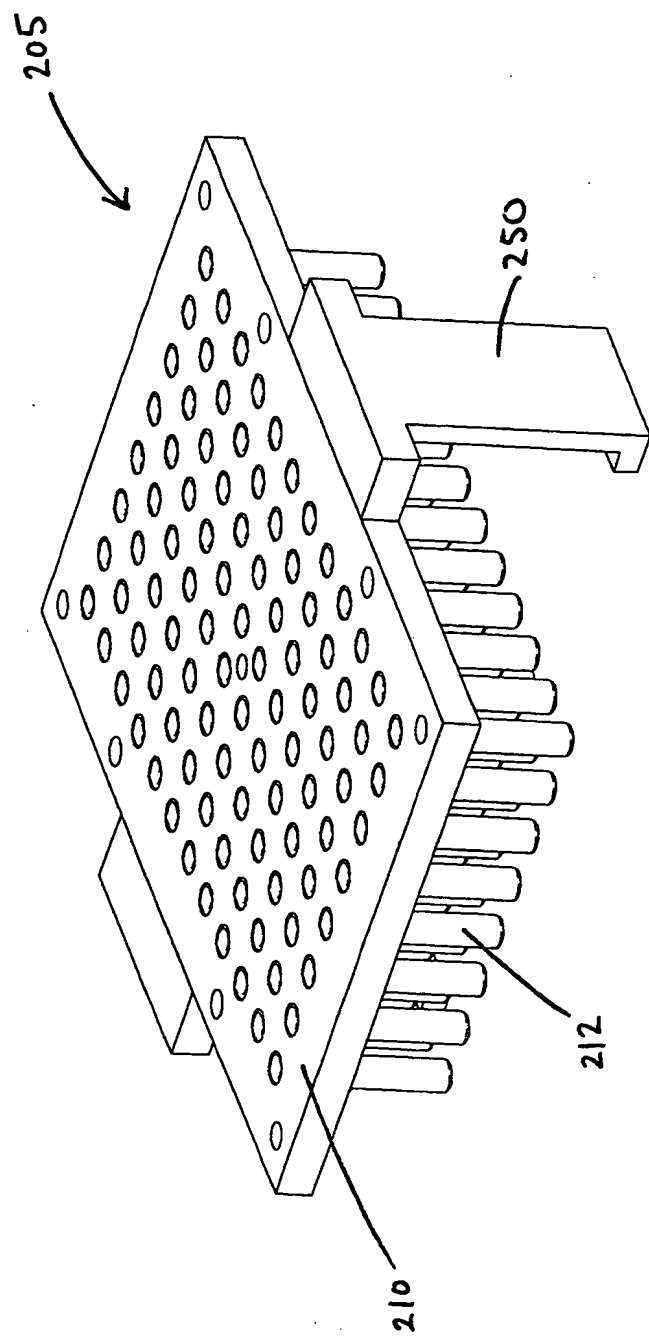


Fig. 3A

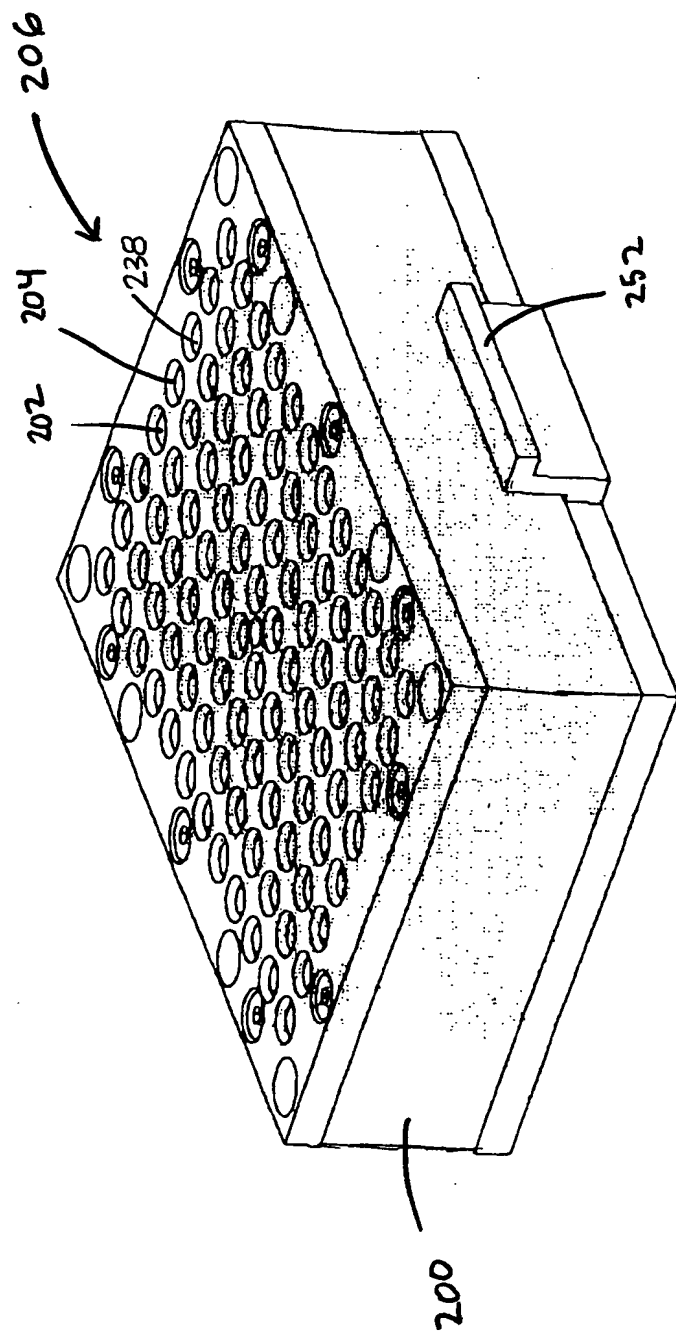


Fig. 3B

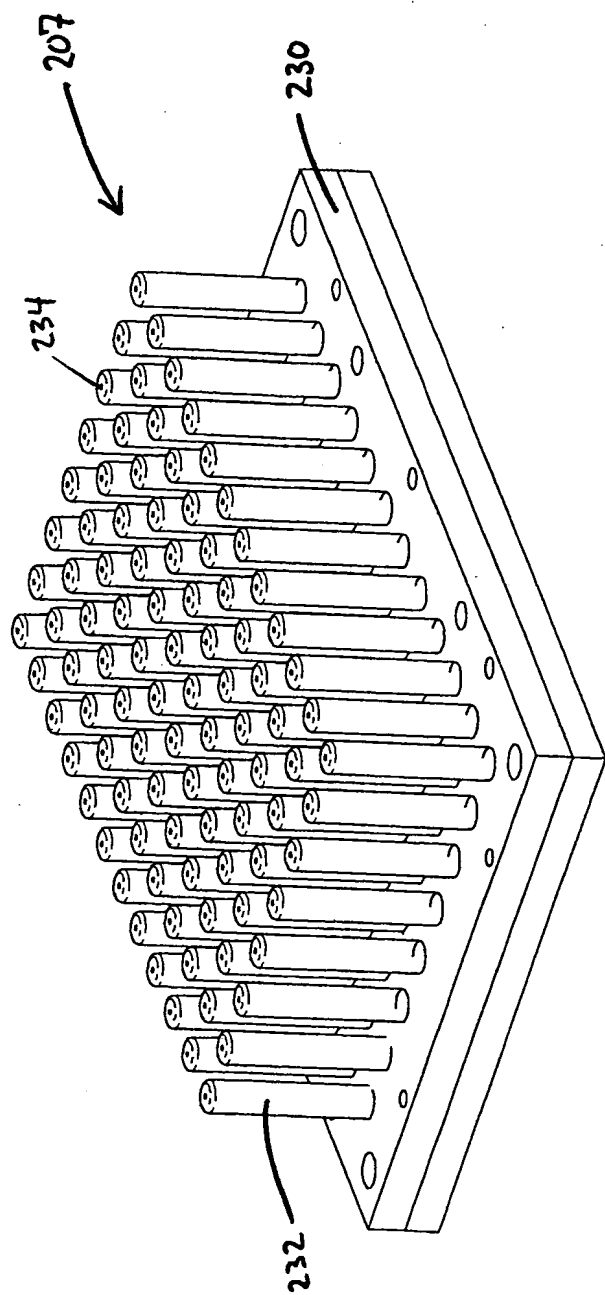


Fig. 3C

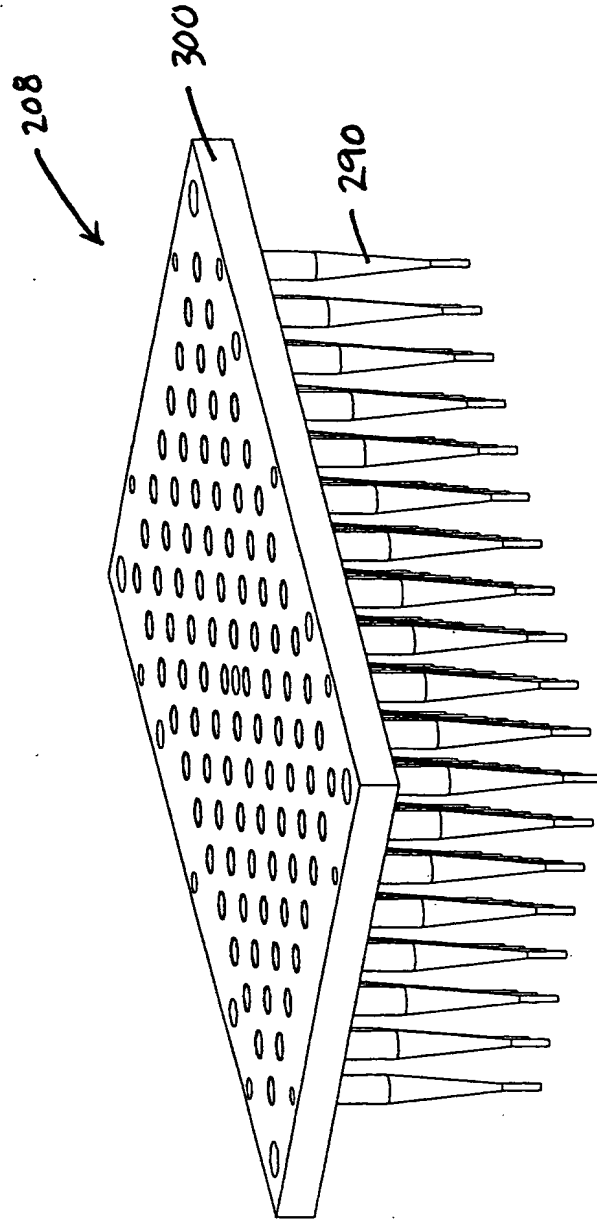
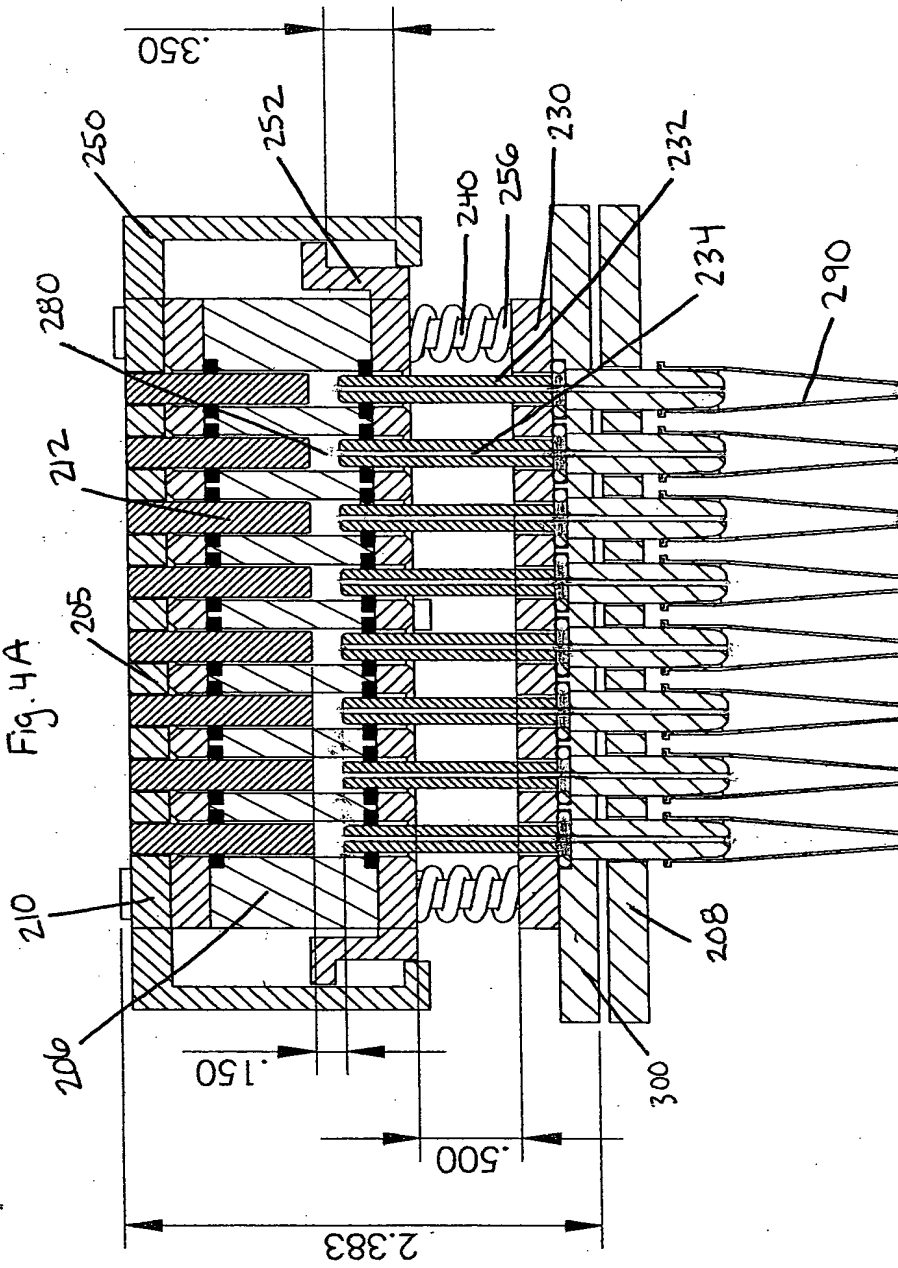
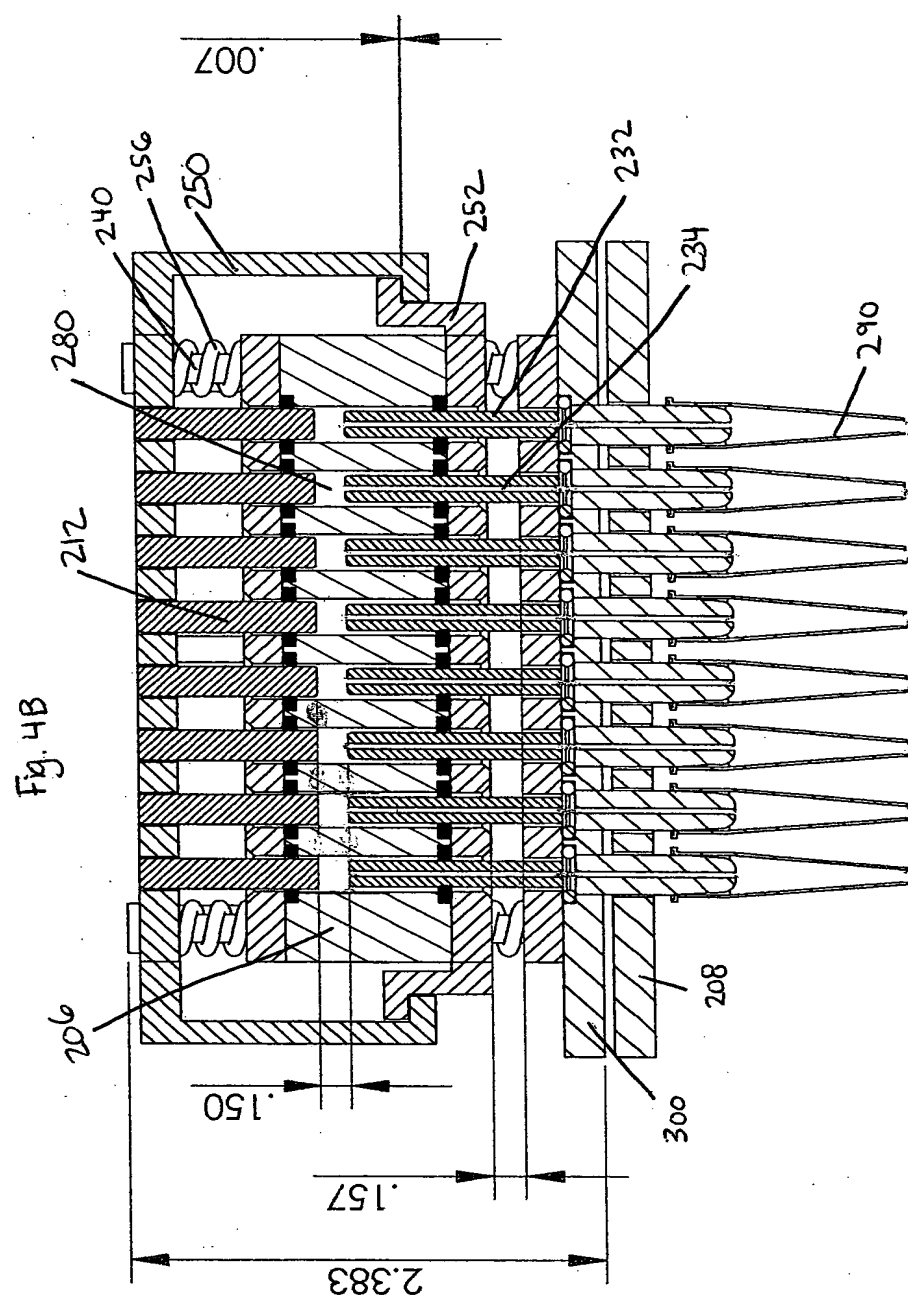


Fig. 3D



Fig. 4A





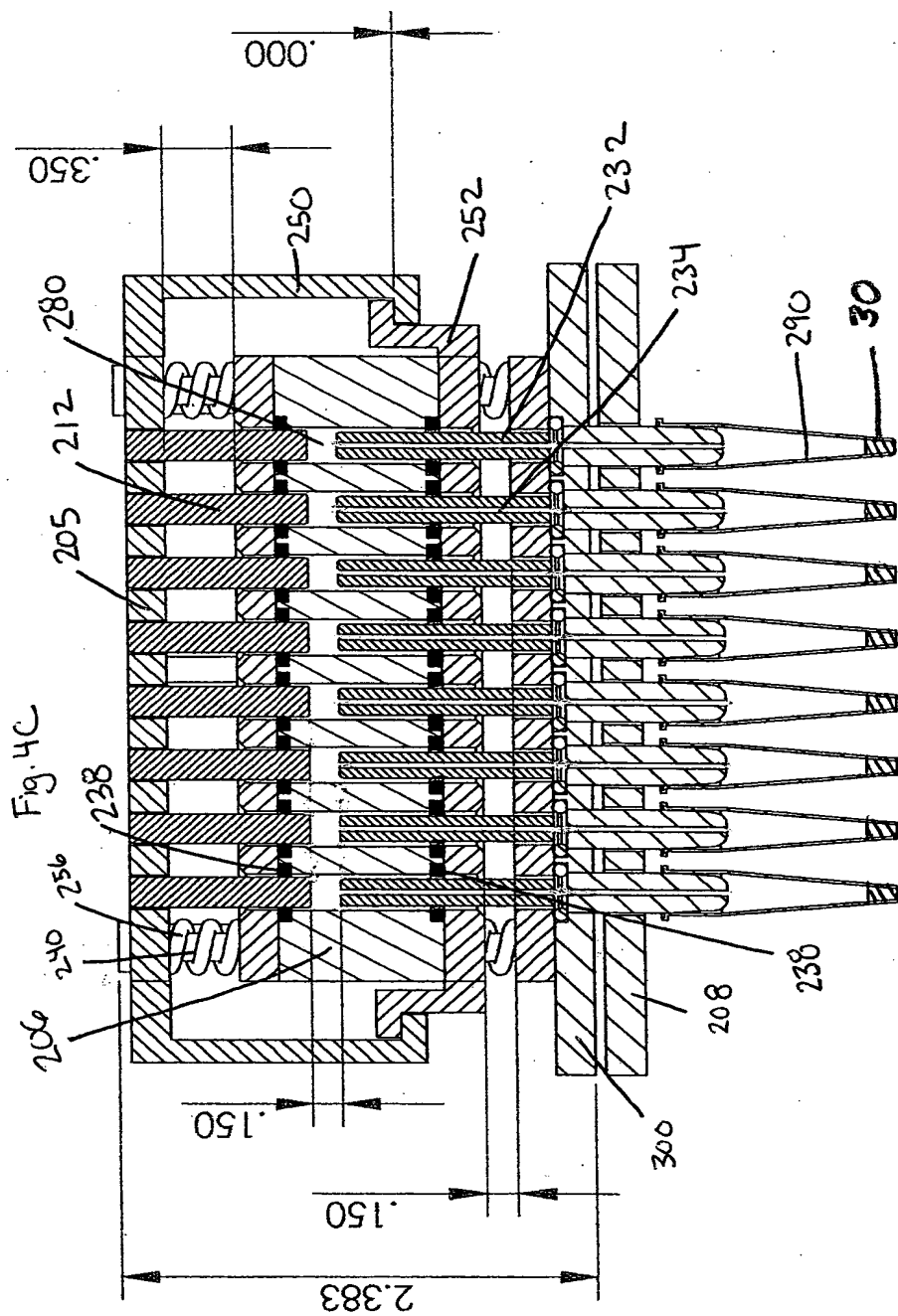
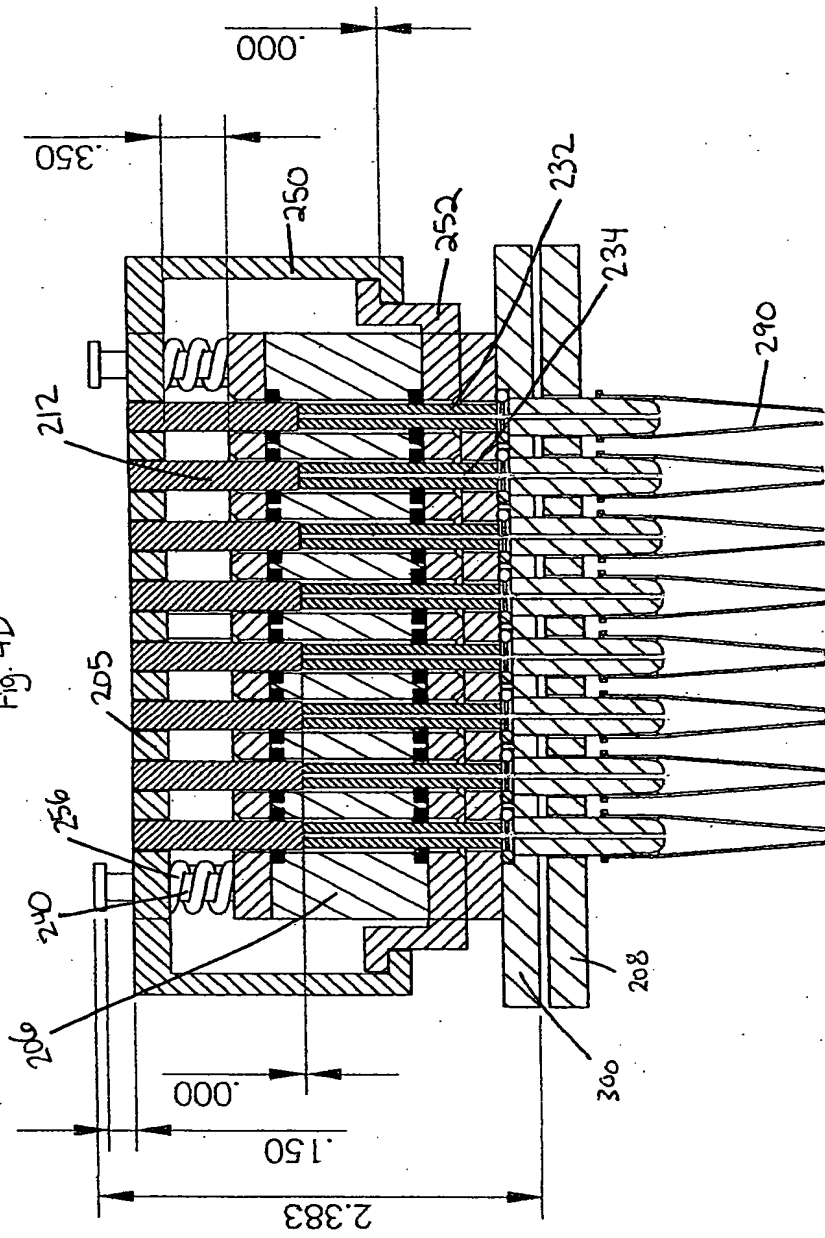


Fig. 4D



30

0

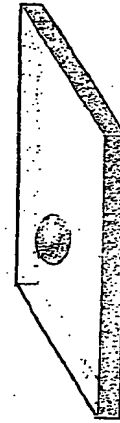


























Figure 5.

Cross Section	Diameter (inches)	Cross Sectional Area (square inches)	Res (uL/inch)	Res (mm/uL)	Flow Max (uL/sec)	Maximum Tip Escape Velocity (meters/sec) for tip diameters (inches)			
						0.020	0.016	0.012	0.010
 <p>Hypothetical fine resolution conventional pipetter</p>	0.033	0.0009	14	1.8	20	0.10 	0.16 	0.29 	0.41 
 <p>Conventional pipetter</p>	0.062	0.003	50	0.51	69	0.4 	0.6 	1.0 	1.5 
						Hanging drop Blastoff			
 <p>Conventional pipetter</p>	0.125	0.0123	202	0.13	282	1.4 	2.3 	4 	6 
 <p>PRESENT INVENTION</p> <p>0.187"</p> <p>Bulk mode</p> <p>Differential mode (fine resolution)</p> <p>0.184"</p>	0.184	0.026	454	0.062	635	3 	5 	9 	13 
	0.033	0.0009	14	1.8	20	0.10 	0.16 	0.29 	0.41 

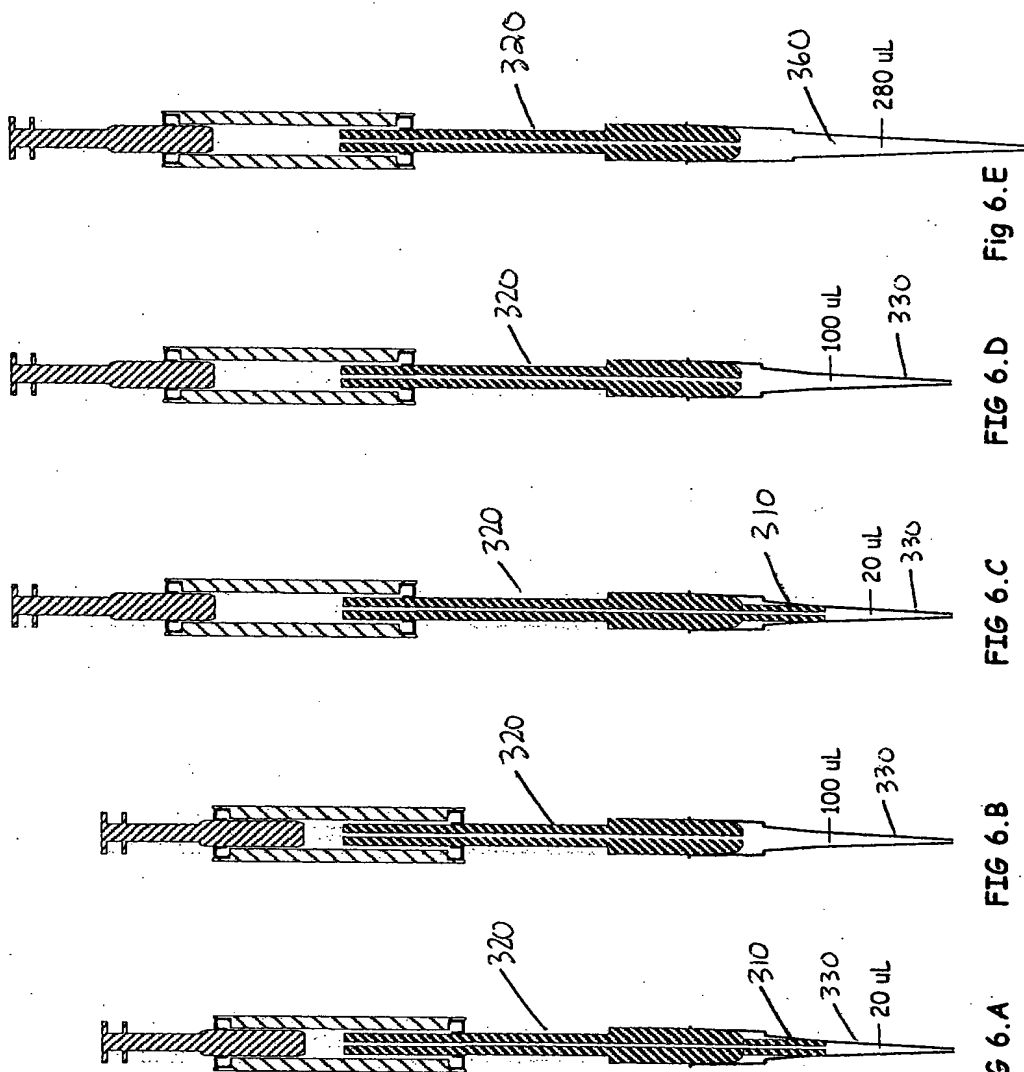


FIG 6.A

FIG 6.B

FIG 6.C

FIG 6.D

FIG 6.E

Total Dead Space	130 uL	210 uL	350 uL	430 uL	610 uL
Smallest volume sample (170 nanoliters)	0.17 uL	0.60 uL	1.5 uL	2 uL	2 uL
Largest volume sample	20 uL	50 uL	20 uL	50 uL	130 uL

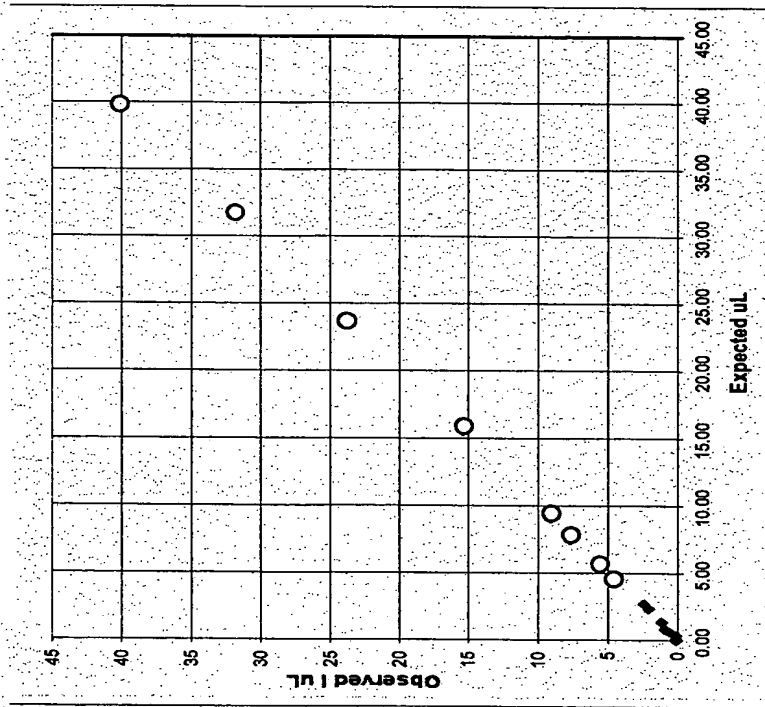
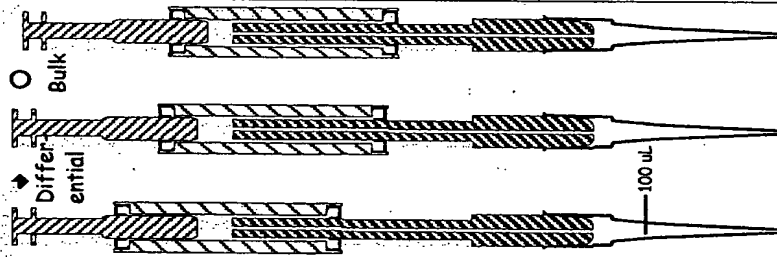


Fig. 7A



210 uL total  
internal dead  
space

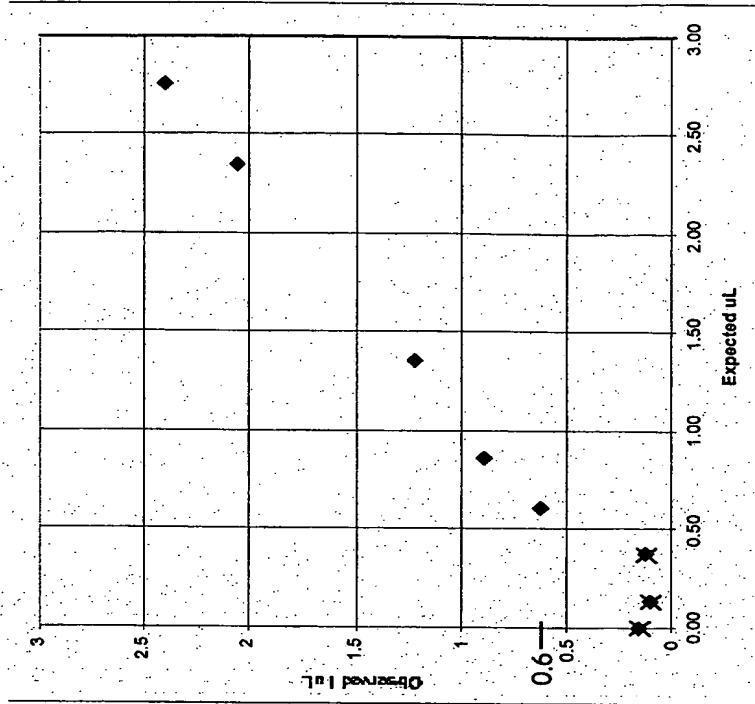


Fig. 7B

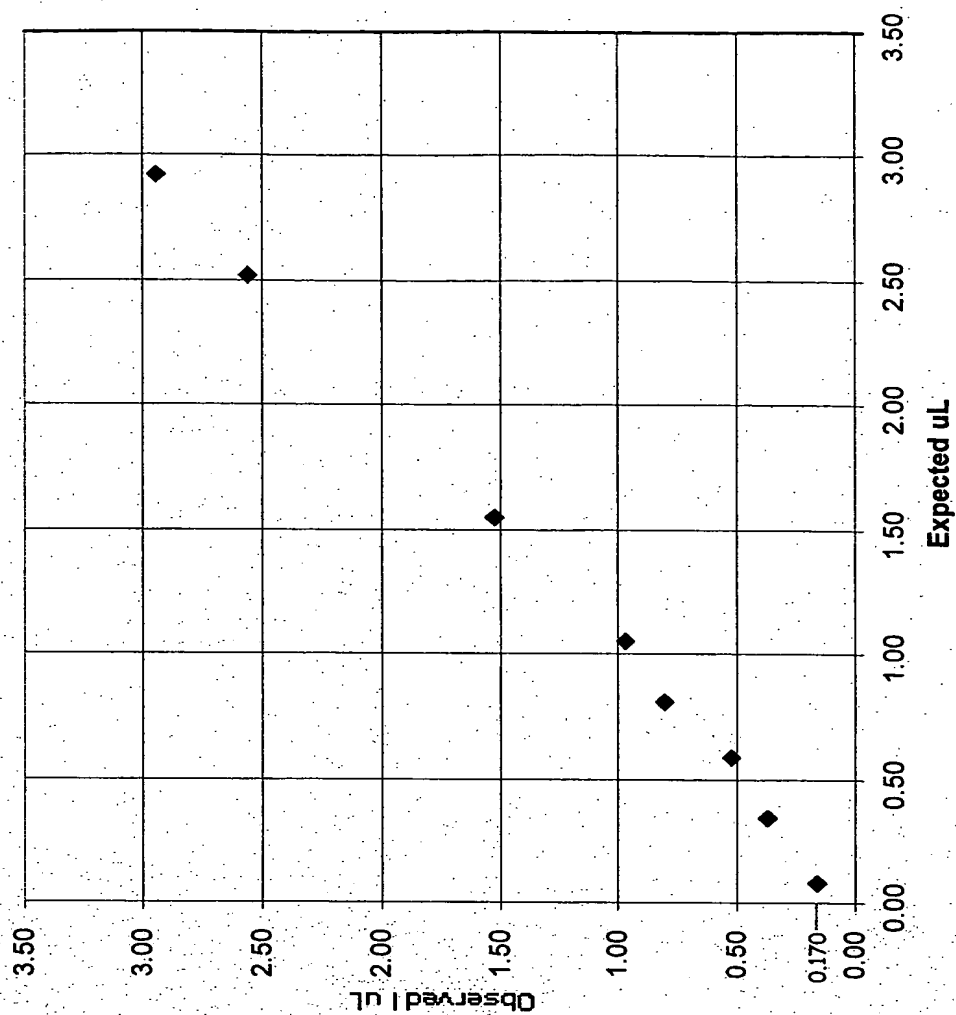
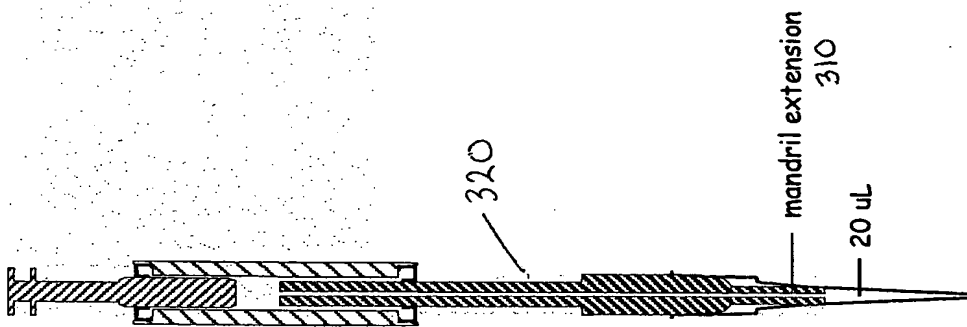
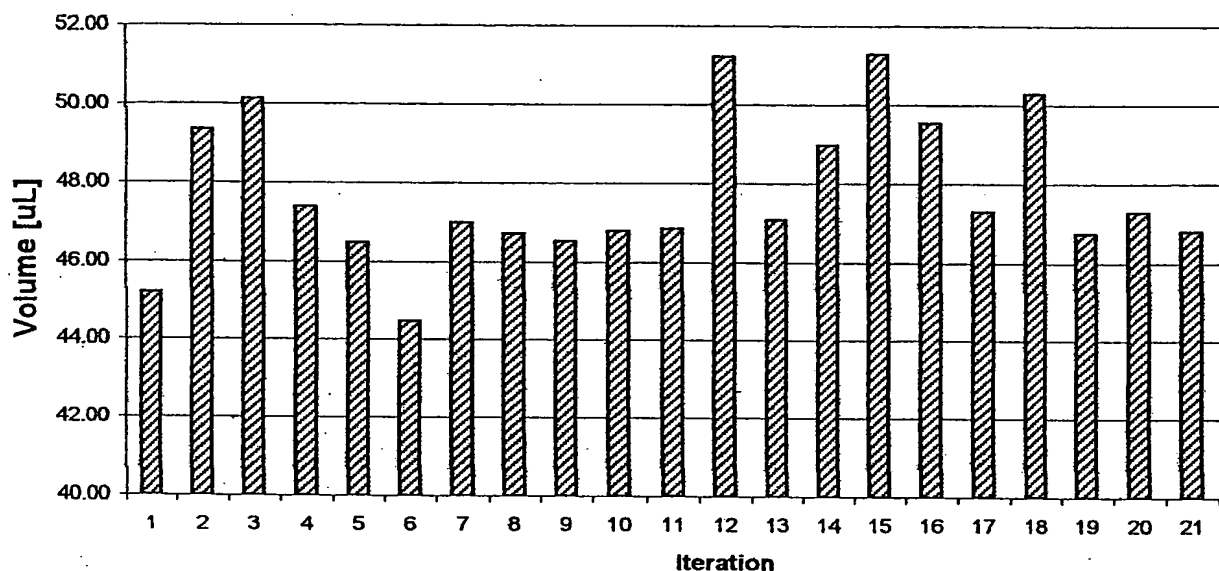


Fig. 8



FIG. 9

Dispense Precision in DRD BULK MODE *underwater*  
in Large 5 mL (5,000 uL) Internal Air Space Pipette  
Standard Deviation 1.83 uL CV 3.8%



Dispense Precision in DRD DIFFERENTIAL MODE *underwater*  
in Large 5 mL (5,000 uL) Internal Air Space Pipette  
Standard Deviation 0.21 uL CV 0.4%

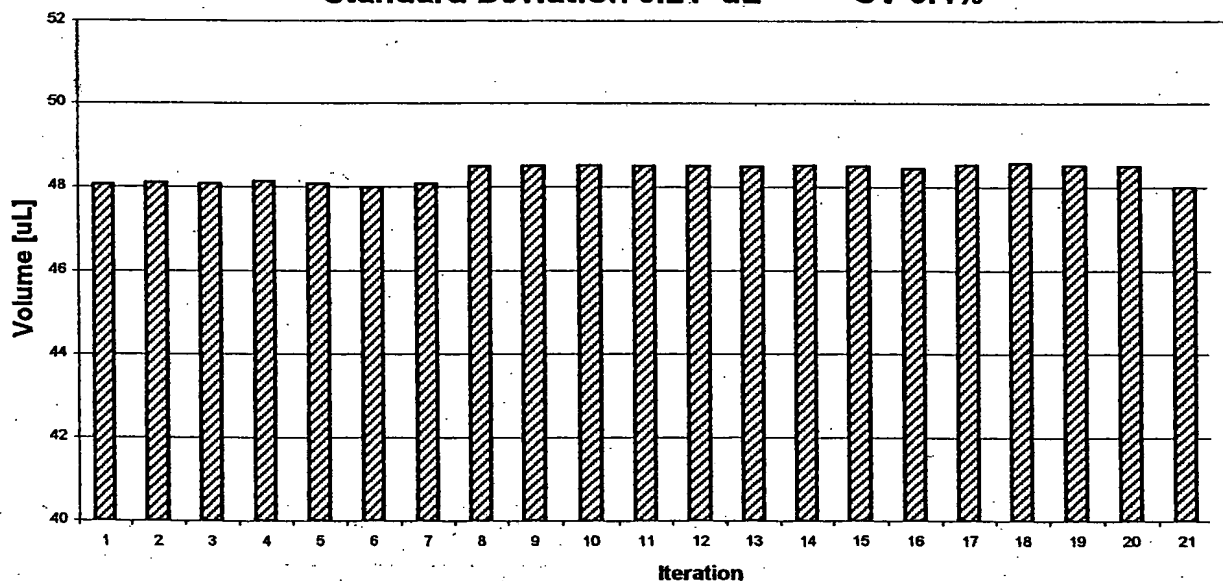


Fig.10

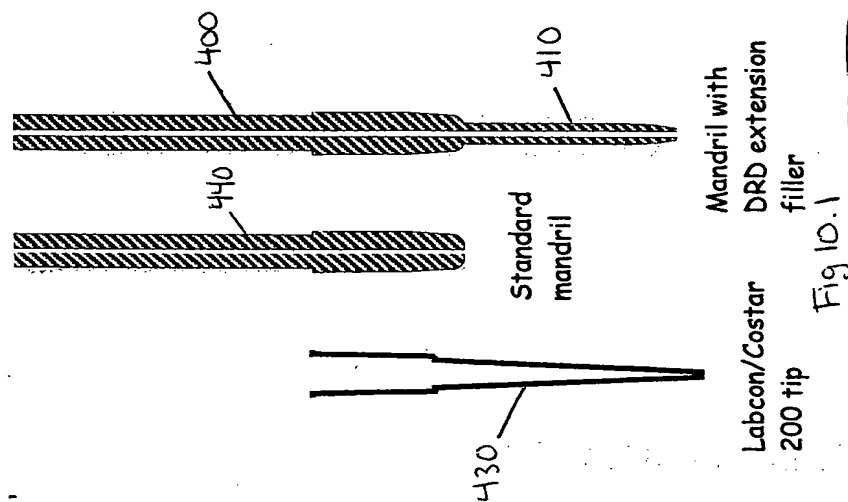


Fig.10.1

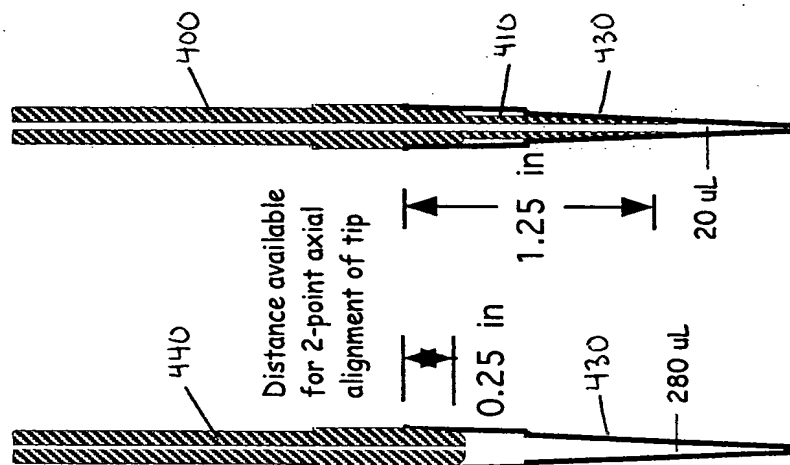


Fig.10.2

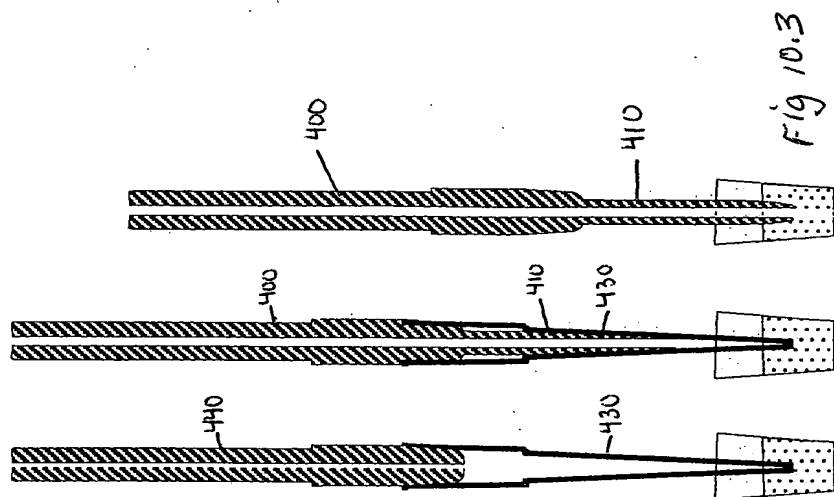


Fig.10.3

Fig. 11



Fig. 11.1

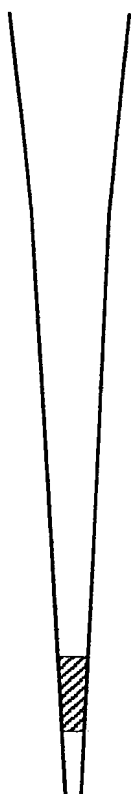


Fig. 11.2



Fig. 11.3

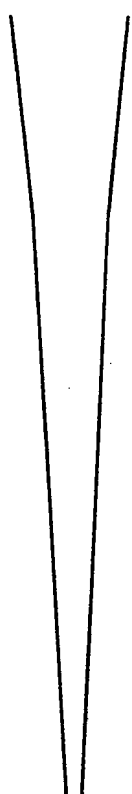


Fig. 11.4

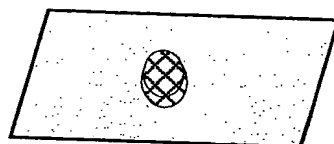


Fig. 12

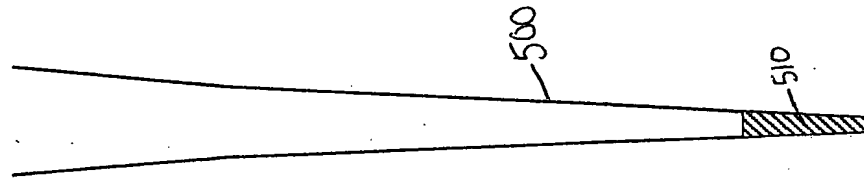


Fig. 12.1

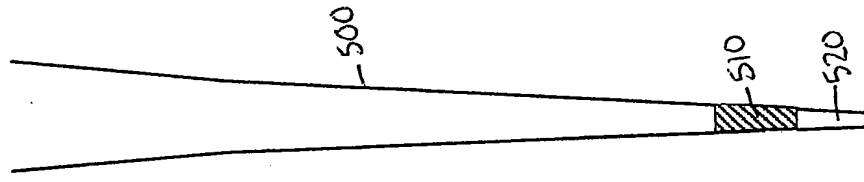


Fig. 12.2

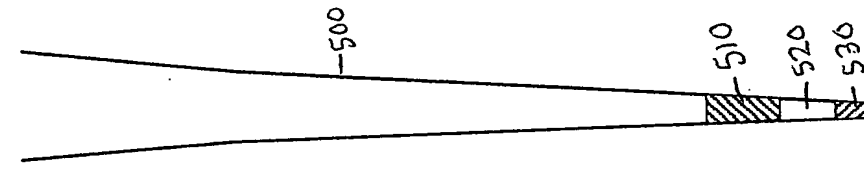


Fig. 12.3

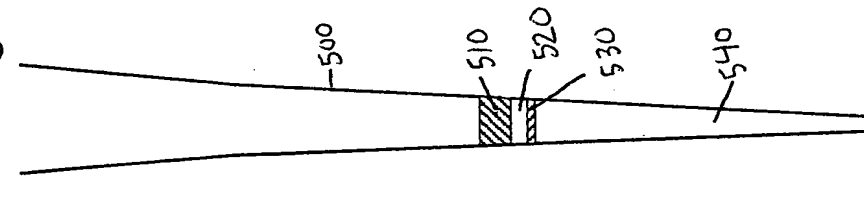


Fig. 12.4

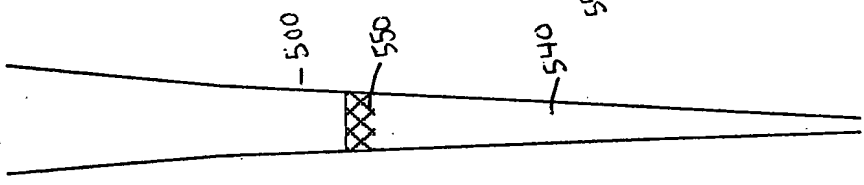


Fig. 12.5

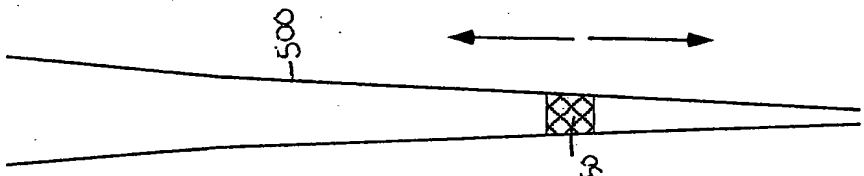


Fig. 12.6

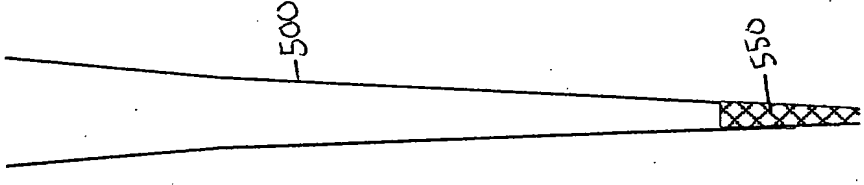


Fig. 12.7

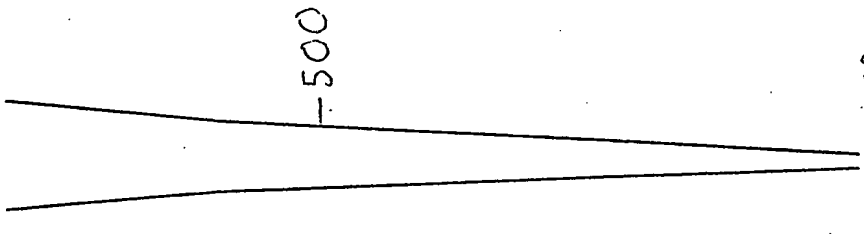


Fig. 12.8

Fig. 13

